



Site 348 Atlantic Breeze Condominiums

Overview: The Atlantic Breeze Condominium potential restoration site is located on the south side of Route 1A (Beach Road) approximately 0.5 mi west of the Salisbury Beach State Reservation access road. The potential restoration site consists of a recently approved condominium development that is still under construction. The potential restoration site was formerly occupied by a motel and a cluster of rental cabins. The property includes a small (approximately 0.8 acre) emergent wetland separated from the adjacent expansive salt marsh by a low earthen berm. The berm is approximately 4 ft in height and 8 ft in width. There is a single culvert through the berm which is a 22 ft long, 12 in diameter cast iron pipe. The marsh upstream of the berm is largely colonized by a vigorous stand of *Phragmites*. The eastern edge of the wetland is comprised of a small stand of *Typha* and the western edge includes a narrow forested wetland dominated by red maple. The ditch immediately downstream of the berm is poorly maintained and is obstructed by vegetation (primarily brackish species). The potential restoration site is connected by a complex of ditches to Allen Creek. The area may also receive flow from Black Rock Creek to the east. Allen Creek joins Black Rock Creek approximately 0.6 mi before entering the Merrimack River. The existing 12 in pipe through the berm appears to restrict tidal flow during major tide events. Tide gauge data collected in late May of 2005 documented a maximum restriction of approximately 1.4 ft during a large storm event on May 26th. However, the restriction is substantially reduced to only a few tenths during more typical spring tide conditions. Other evidence of a tidal restriction includes: impounded conditions upstream of the berm, obstructed flow within the ditch just below the berm, the presence of *Phragmites*, and minor subsidence of the upstream marsh plain. The approximate dimensions of the ditch below the berm are 3.2 ft in width and 2.2 ft in depth. A ditch shown on the current USGS mapping extending into the potential restoration site is no longer present, presumably due to sediment accumulation.

As mentioned above all of the restoration area is privately owned. Based on a review of condominium site plans, it appears that a small portion of the berm, as well as the entire restoration area is within the condominium parcel. The majority of the berm is part of an adjoining parcel.

Structure conditions: The existing berm is approximately 4 ft in height and 8 ft in width. It is generally well vegetated with small trees but shows some signs of erosion from past storm events. Overall the berm is in fair condition. The single culvert through the berm consists of a 22 ft long, 12 in diameter cast iron pipe. There are no headwalls or scour protection at the culvert ends, however, no signs of scour were observed. Tidal flow into the culvert would be enhanced with the maintenance of the ditch below the berm. The culvert is in fair overall condition. The outlet of a recently installed water quality structure (Vortech) discharges into the wetland just upstream of the berm. The original function of the berm is unknown.

Ecological Integrity: The potential restoration site generally has a low level of ecological integrity. The emergent wetland is dominated by a vigorous stand of *Phragmites*. The potential restoration site currently receives a substantial volume of stormwater from the adjacent condominium development. However, the stormwater management within the development incorporates several BMP's including deep sump catch basins, treatment swales and a Vortech water quality structure. While the stormwater management plan provides some treatment and controls the rate of runoff into the wetland, the total volume of freshwater entering the wetland has likely increased with the new development. The Condominium has received an Order of Conditions from the Salisbury Conservation Commission to control *Phragmites* with



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herbicide application. The control of the plant would be aided by increased salinity within the basin, as well as effective drainage of freshwater contributions during ebbing tides.

Based on biological benchmark data, the potential restoration site lies slightly below the elevation of the adjacent healthy high marsh downstream of the berm (approximately 0.2 ft). However, there are several brackish species also present in the marsh just downstream of the berm, as well as several nearby fringing stands of *Phragmites* adjacent to the unrestricted salt marsh. These areas appear to be associated with zones of freshwater discharge from adjacent uplands.

The adjacent salt marsh is mapped as BioMap Core Habitat, Priority Habitat for State-Protected Rare Species and Estimated Habitat for Rare Wildlife. The surrounding developed lands consist of high density residential. Although the majority of the potential restoration site consists of *Phragmites*, the eastern edge of the restoration area is comprised of a small stand of *Typha*, and the western edge includes a narrow forested wetland dominated by red maple. The elevated culvert invert restricts fish passage into the restoration area; however the available habitat is limited. Intertidal habitat below the confluence of Allen Creek and Black Rock Creek is mapped as suitable habitat for soft-shelled clam and blue mussel.

Two tide gauges were deployed from May 18 to June 2, 2005 upstream and downstream of the culvert under the berm. There were a total of 23 tidal cycles recorded downstream of the culvert during the deployment period. Results of the deployment show that there is a significant restriction of tidal flow through the culvert to the upstream portion of the marsh during large tidal events. The total tidal prism of the marsh creek downstream of the culvert is more than 3 ft. The tidal prism upstream of the culvert varies from 0 to approximately 1.5 ft. The gauge upstream of the culvert recorded a tidal prism on 16 of the 23 tidal cycles, when the tide height downstream was 5.50 ft or higher. The highest tide downstream of the culvert was recorded during a major coastal storm on May 26 at 1:57 AM. The NGVD adjusted height was 8.34 ft. The upstream adjusted height was 6.91 ft and occurred at 3:49 AM. The restriction caused a tidal dampening of 1.43 ft upstream of the culvert and a delay of 1 hr 52 minutes. The largest measured tidal dampening of 1.54 ft occurred on May 24th. This dampening amounted to approximately 57.0% of the total tidal prism recorded at the downstream gauge. When tidal heights are high enough, there is both a significant dampening and delay of tidal flow into the restricted marsh. The lack of a creek system within the restoration area, as well as impeded flow within the ditch below the berm, resulted in the impoundment of water during a large portion of the deployment period. The impounded water within the restoration area was likely runoff from the surrounding developments.

Relatively low salinities of 1.6 and 1.9 ppt (downstream and upstream, respectively) were recorded on a mid-ebbing tide. These values are indicative of significant freshwater contributions to the marsh system, especially during periods of runoff from the surrounding development.

Overall, the existing impairments are considered severe. Removal of a portion of the berm within the condominium parcel along with maintenance and/or cutting of additional ditches would reduce the tidal restriction during larger tide events and reduce the impounded conditions which likely further reduce salinity levels within the potential restoration site. These measures could dovetail with the currently permitted herbicide control measures to reduce *Phragmites* coverage within the restoration area. These steps will also reduce the fire safety hazard associated with *Phragmites* and improve fish foraging habitat. The surrounding development was constructed above the elevation of the predicted 100-year flood so there are no low-lying property concerns.



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Socioeconomic: Given the private land ownership, the overall recreational and educational values are limited. However, there are excellent outreach opportunities within the condominium association itself which would directly observe the restoration benefits. The Uniqueness/Heritage value is enhanced by its proximity to the extensive marsh area mapped as BioMap Core Habitat, Priority Habitat for State-Protected Rare Species, and Estimated Habitat for Rare Wildlife. The potential restoration site does not include any known cultural resource elements or urban setting values.

Construction Logistics/Feasibility: The overall feasibility and constructability for this potential restoration site is considered high. The condominium development is still under construction and has ample room for a staging area. The work would consist of removing a portion of the berm along with maintenance and/or cutting of additional ditches. Breaching the berm would require limited excavation and could be stabilized with bioengineering measures. The small amount of earth work could be scheduled with lower tide cycles greatly reducing or eliminating the need for water control. The construction cost is estimated to be \$25,000. The project has a high level of local support from the Town and developer (presumably the condominium association as well when it is formed) given the fact that the work would enhance ongoing control measures. Establishing the exact property line in relation to the existing berm is necessary to determine if the work can avoid the adjacent parcel. Past efforts to remove the berm were reportedly not supported by the abutter.

Restoration Potential: The site is considered to have moderate restoration potential based on the presence and severity of the impairments, relationship with on-going *Phragmites* control efforts, lack of low-lying properties and low overall construction costs. However, given the relatively small size of the restoration effort the cost per acre is relatively high. There are also limited socioeconomic benefits associated with the project. The limited scope of this restoration effort is well suited for the Northeast Mosquito Control District as they would have the necessary equipment and traditional permitting efforts would likely exceed the cost of implementation.

Beach Road

 Potential Restoration Site

 Photo Locations

 Tide Gauges

 Benchmark

 Ground Elevation

Datum: NGVD 29





Photo 1 - View of Berm and Restricted Marsh Beyond



Photo 2 - Marsh Downstream of Berm





Photo 3 - *Phragmites* Upstream of Berm



Photo 4 - Upstream View of Culvert Under Berm





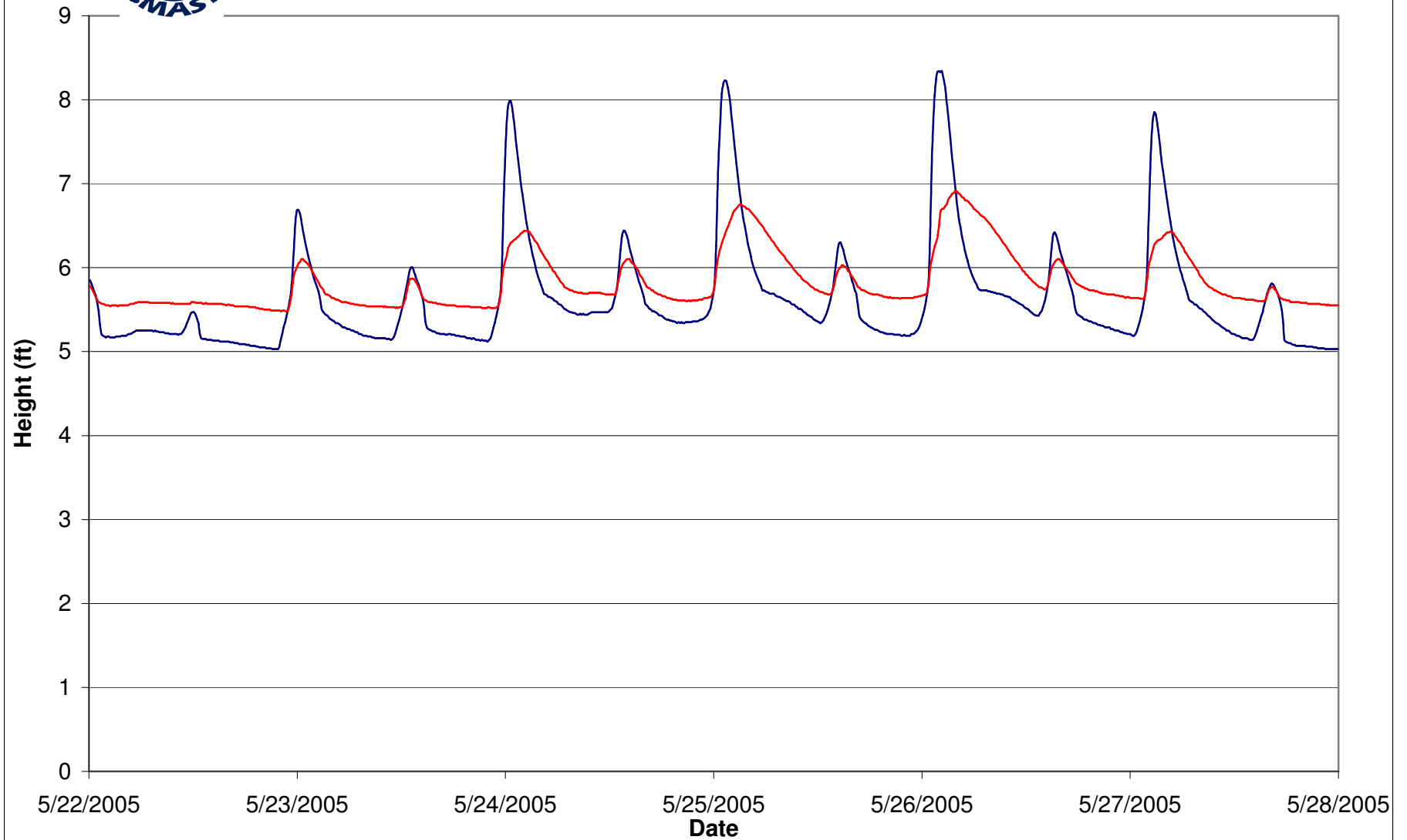
Photo 5 - Redevelopment Adjacent to Restoration Area





Site 348: Atlantic Breeze Condominiums, Salisbury, MA

Down Stream
Up Stream





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Atlantic Breeze Condominiums



Site Information

Site ID:

Site Name:

Municipality:

Location:

Adjacent Waterbody:

Affected Area (Acres)

Mudflat/Open Water: Total Area:

Salt Marsh:

Other Wetland: Other Description:

Other:

Impairment(s)

Tidal Restriction ☒ Fill ☐

Obstructed Ditch(es) ☒ Invasive Species ☒

Impoundment ☒ Pollution / Siltation ☐

Severity of Impairments

Project Type

Roadway Culvert(s) ☒ Obstructed Ditches ☒

Bridge ☐ Fill ☐

Berm ☒ Other

Evidence of Restriction

Gauge Data ☒ Impounded Flow ☒

Downstream Scour Pool ☐ Obstructed Flow ☐

Upstream Scour Pool ☐ Invasive Species ☒

Bank Erosion ☐ Ponded Conditions ☐

Slumping ☐ Subsidence ☒

Structure / Channel:

Overall Condition:

Life Expectancy (Years):

Road Condition:

Structure Type:

Structure Age (Years)

Structure 1 Width (Feet):

Structure 1 Length (Feet):

Structure 2 Width (Feet):

Structure 2 Length (Feet):

Skew (Degrees):

Cover (Feet):

Scour Protection: ☐

Adequately Aligned: ☐

Headwall Type:

Headwall Condition:

Ecological Integrity / Habitat Value

Surrounding Land Use %

Commercial / Industrial

Residential

Agricultural

Undeveloped

Severity of Impairment(s)

Invasive Plant Cover:

Extent of Wooded Buffer:

Habitat Connectivity:

NHESP Estimated Habitats of Rare Wildlife: ☒

NHESP Priority Habitats of Rare Species: ☒

NHESP BioMap Core Habitat: ☒

NHESP BioMap Supporting Natural Landscape: ☐

ACEC: ☐

Anadromous Fish: ☐

Shellfishing Suitability: ☒

Barriers to Fish Passage



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Construction Logistics / Feasibility

Traffic Volume	<input type="text" value="None"/>
Detour Potential	<input type="checkbox"/>
Site Access	<input type="text" value="Good"/>
Staging Areas	<input checked="" type="checkbox"/>
Fill Material Concern	<input type="text" value="Minimal"/>
Low Lying Property Concerns	<input type="text" value="Minimal"/>
Overhead Utility Constraint	<input type="text" value="None"/>
Underground Utilities	
Water <input type="checkbox"/>	Telephone <input type="checkbox"/>
Gas <input type="checkbox"/>	Sewer <input type="checkbox"/>
Electric <input type="checkbox"/>	Drainage <input type="checkbox"/>
Permitting Complexity	<input type="text" value="Low"/>
Local Support	<input type="text" value="Yes"/>
Feasibility Cost	<input type="text" value="15,000"/>
Design Cost	<input type="text" value="20,000"/>
Permitting Cost	<input type="text" value="15,000"/>
Construction Cost	<input type="text" value="25,000"/>
Total Cost	<input type="text" value="75,000"/>
Relative Cost/Acre	<input type="text" value="94,000"/>

Socioeconomic

Recreation	Education
Public Access: <input type="checkbox"/>	Schools Nearby: <input type="checkbox"/>
Watercraft / Portage: <input type="checkbox"/>	Ongoing Research: <input type="checkbox"/>
Wildlife Viewing: <input checked="" type="checkbox"/>	Education / Outreach Potential: <input type="text" value="Medium"/>
	Safety Concerns (Access): <input type="text" value="Low"/>
Uniqueness / Heritage Value	
Rare Species Habitat: <input checked="" type="checkbox"/>	
ACEC: <input type="checkbox"/>	
Cultural Resource Features <input type="checkbox"/>	
Urban Viewscape Value: <input type="text" value="None"/>	
Urban Habitat Value: <input type="text" value="None"/>	

Tide Surveys

	<i>Start:</i>		<i>Finish:</i>
Dates of 1st Survey:	<input type="text" value="5/18/2005"/>	-	<input type="text" value="6/2/2005"/>
Date of Highest Tide:	<input type="text" value="5/24/2005"/>		
Max Measured Tidal Dampening:	<input type="text" value="1.54"/>		
Percent of Tidal Prism:	<input type="text" value="57"/>		
Measured Delay:	<input type="text" value="1 hr 52 min"/>		
	<i>Start:</i>		<i>Finish:</i>
Dates of 2nd Survey:	<input type="text"/>	-	<input type="text"/>
Date of Highest Tide:	<input type="text"/>		
Max Measured Tidal Dampening:	<input type="text"/>		
Percent of Tidal Prism:	<input type="text"/>		
Measured Delay:	<input type="text"/>		

Summary

Uniqueness / Heritage Value:	<input type="text" value="Medium"/>	Ecological Integrity:	<input type="text" value="Low"/>
Recreational Value:	<input type="text" value="Low"/>	Logistics / Feasibility:	<input type="text" value="High"/>
Educational Value:	<input type="text" value="Medium"/>		
Restoration Potential:			<input type="text" value="Moderate"/>